CLASSIFICATION SECRET

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

REPORT

CD NO. [redacted]

25X1

COUNTRY East Germany

DATE DISTR. 23 February 1955

SUBJECT Manufacture of Silicon Diodes at VEB Werk fuer Bauelemente der Nachrichtentechnik "Carl von Ossietzky", Teltow

NO. OF PAGES 6

PLACE ACQUIRED [redacted]

NO. OF ENCLS. (LISTED BELOW)

25X1

DATE OF INFO. [redacted]

SUPPLEMENT TO REPORT NO.

[redacted]

THIS IS UNEVALUATED INFORMATION

25X1

[redacted]

VEB Werk fuer Bauelemente der Nachrichtentechnik "Carl von Ossietzky" (formerly Dralowid), in Teltow, on the significance of silicon crystal diodes: 25X1

"This firm calls semi-conductor diodes (Halbleiterdioden) a circuit element whose resistance is dependent upon the direction of the current and which has two contacts (a dipole in the meaning of circuit theory). It is used in circuits of the weak-current technology, as, for instance, in telecommunications technology, measurement technology and circuit technology. The device is designated by the name silicon diode. When the rapid development of radar technology extended to the fields of decimeter and centimeter waves, crystal diodes obtained increasing significance and they now are even starting to displace electron tubes in numerous fields of application. The reasons for this development are obvious. Crystal diodes have important advantages as compared with tube diodes and surface rectifie[redacted] volt, they have higher conductivity than tube d[redacted] heating and therefore do not contribute to di[redacted] (Brummstoerungen). In addition, they are largely independent [redacted] frequency because of their small self-capacity and because of the ele[redacted] qualities of silicon. The physical qualities of diodes, such as their very small dimensions, small weight and the fact that [redacted] kets and vacuum are unnecessary, make it possible to build the diodes into the [redacted] rcuit in a very easy way. The current-voltage characteristics pass through zero and is almost linear for small inversed voltages, and approximately quadratic in the "pass area" (Durchlassbereich). Silicon diodes are now being used increasingly as rectifiers for alternating voltage and as mixer diodes (Mischdioden) for highest frequencies. In addition to numerous appli[redacted]s which they have in special f[redacted], [redacted]iodes are particularly useful [redacted] rashort wave and centimeter w[redacted]. The fact that the characteristi[redacted] ennlinie) is not linear makes it possible to use diodes in many special[redacted] cuits for the purpose of measurement." [redacted]

2. The following are general indications also contained in the directive on the [redacted]

25X1

CLASSIFICATION SECRET

STATE	X	NAVY	X	NSRB		DISTRIBUTION		OSI Ev	X
ARMY	X							ORR Ev	X

25X1

"Two metal caps are welded upon a ceramic shell. One cap houses the anti-electrode of the silicon crystal, which consists of an "S"-shaped molybdenum wire of 90-micron diameter. The other cap has a thread which holds the screw electrode upon which the silicon crystal is welded. These diodes, thus, are point-contact diodes causing rectification through the contact between metal point and semi-conductor crystal."

3. The firm put out two types of diodes called mixer diodes (Misch[redacted]des (Richtdioden); in abbreviation, MD and RD. [redacted] manufactured in four different construction form[redacted] drawings of the four types, with dimensions indicated).

4. The following is the German nomenclature for the characteristic data of the diodes as used in the annexed table (Annex 3), which lists the characteristic data of all diodes manufactured by the Dralowid firm. The numbers in brackets appearing in the following sub-paragraphs are keyed to the numbers appearing in the various headings on Annex 3.

a. The direction of the current [redacted] sistance is called "Durchlass-richtung". The current is ca[redacted]strom (1).

b. The direction of the current wit[redacted] resistance is called "Sperrrichtung". The current in this case is call[redacted]trom (2).

c. Both Durchlasstrom and Sperrstrom are currents in Durchlassrichtung which flow at a given direct voltage.

d. The Widerstandsverhaeltnis [redacted] Durchlasswiderstand at the[redacted]

e[redacted]d in watts is the average value

f[redacted]omposed of the capacity of the

g. The mechanical Schuettelfestigkeit (6) is expressed in multiples of the gravitation constant "g." The diodes put out by Dralowid withstand shaking with a sinusoidal acceleration of maximum 5g.

h. The Temperaturbereich (7) of the diodes is the temperat[redacted]n which a diode can be stored or operated without permanent cha[redacted]ectric qualities.

i. The Temperaturkoeffizient (8) pertains to the changes of the current at the given voltage and to the linear temperature dependency of Durchlasstrom and Sperrstrom. It is expressed in percent per centigrade.

j. The Nennfrequenz (9[redacted]aximum value of frequency up to which a decrease of the Richtstrom i[redacted]l.

k. The Mischdaempfung (10) is determined by the relation between the high frequency input and the medium frequency output. It is expressed in decibels (db).

25X1

[redacted] 25X1

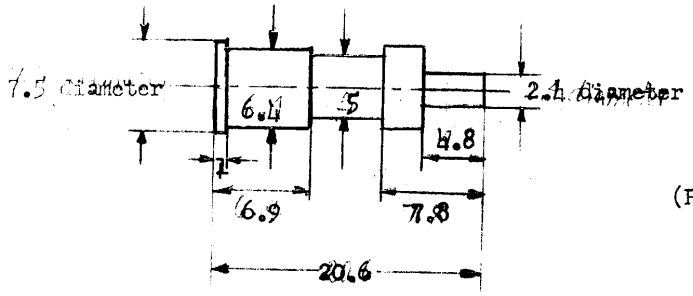
1. [redacted] Comment. The following are English equivalents for the German terms used in paragraph 4: 25X1

Durchlassrichtung - low resistance direction
Durchlasstrom - low resistance current
Sperrichtung - high resistance direction
Sperrstrom - high resistance current
Durchlasswiderstand - low resistance resistor
Sperrwiderstand - high resistance resistor
Widerstandsverhaeltnis - resistance ratio
maximale Impulsbeanspruchung - maximum impulse load
statische Eigenkapazitaet - static self-capacity
Kapazitaet gegen Masse - capacity in relation to the whole
Schuettelfestigkeit - capacity to withstand shaking
Temperaturbereich - temeperature range
Temperaturkoeffizient - temperature coefficient
Nennfrequenz - rated frequency
Richtstrom - rectified current
Mischdaempfung - mixed attenuation

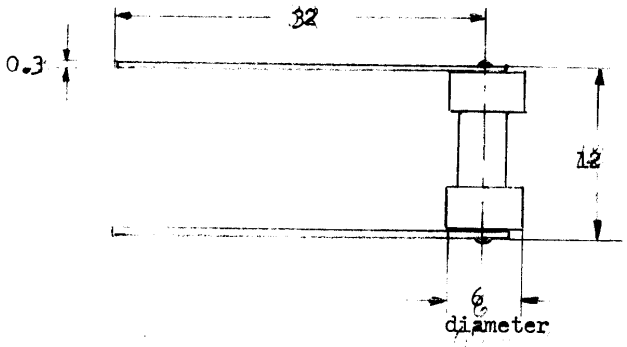
[redacted] 25X1

Annex 1

(All dimensions in millimeters)



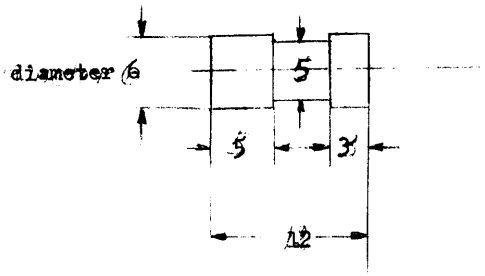
Construction type I
(Patronenausfuehrung)



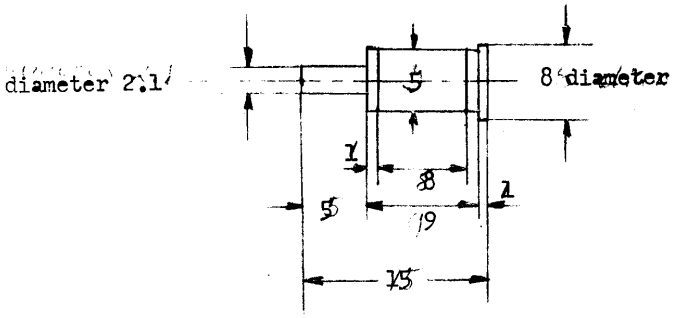
Construction type II
(with Loetfahnen)

Annex 2

(All dimensions in millimeters)



Construction type III
(for special purposes)



Construction type IV
(small type)

25X1

CHARACTERISTIC DATA OF DRALOWID SILICON DIODES 1/

TYPE	(1) in mA at +0.5V	(2) in micro-A at -0.5V	(3) at ±0.5V	(4) (10-7W)	(5) pF	(6) g	(7) Temperature (C) storage	(7) operation	(8) (+10 to +60 Centigrades) % at +0.5V	(8) at -0.5V	(9) GHz	(10) db
MD 1	equal or more than 1	equal or less than 200	equal or more than 5	0.3	less than 1	equal or more than 5	-40;+60	-20;+50				
MD 13	equal or more than 2	equal or less than 200	equal or more than 10	0.3	less than 1	equal or more than 5	-40;+60	-20;+50			10	equal or less than 10
MD 2	equal or more than 0.12 at 70mV	equal or less than 60 at -70mV	equal or more than 2 at ±70mV	0.3	less than 1	equal or more than 5	-40;+60	-20;+50				
RD 1	equal or more than 1	equal or less than 100	equal or more than 10	1	less than 1	equal or more than 5	-40;+60	-20;+60	equal or less than 1	equal or less than 5		
RD 2	equal or more than 0.50	equal or less than 20	equal or more than 25	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		
RD 3	equal or more than 0.50	equal or less than 7	equal or more than 35	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		
RD 4	equal or more than 0.10	equal or less than 2	equal or more than 50	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		

1/ Comment: All diodes listed above are fabricated in four types of construction as shown in annexes 1 and 2.

CS-56635

SECRET

25X1

25X1

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

REPORT

CD NO.

25X1

COUNTRY East Germany

DATE DISTR 23 February 1955

SUBJECT Manufacture of Silicon Diodes at VEB Werk fuer Bauelemente der Nachrichtentechnik "Carl von Ossietzky", Teltow

NO OF PAGES

PLACE ACQUIRED

NO OF ENCLS (LISTED BELOW)

25X1

DATE OF INFO

SUPPLEMENT TO REPORT NO

THIS IS UNEVALUATED INFORMATION

VEB Werk fuer Bauelemente der Nachrichtentechnik "Carl von Ossietzky" (formerly Dralowid), in Teltow, on the significance of silicon crystal diodes: 25X1

"This firm calls semi-conductor diodes (Halbleiterdioden) a circuit element whose resistance is dependent upon the direction of the current and which has two contacts (a dipole in the meaning of circuit theory). It is used in circuits of the weak-current technology, as for instance, in telecommunications technology, measurement technology and circuit technology. The device is designated by the name silicon diode. When the rapid development of radar technology extended to the fields of decimeter and centimeter waves, crystal diodes obtained increasing significance and they now are even starting to displace electron tubes in numerous fields of application. The reasons for this development are obvious. Crystal diodes have important advantages as compared with tube diodes and surface rectifiers. With a few tenths of a volt, they have higher conductivity than tube diodes; furthermore they do not need heating and therefore do not contribute to disturbances caused by noise (Brummstoerungen). In addition, they are largely independent of frequency because of their small self-capacity and because of the electrical qualities of silicon. The physical qualities of diodes, such as their very small dimensions, small weight and the fact that sockets and vacuum are unnecessary, make it possible to build the diodes into the circuit in a very easy way. The current-voltage characteristics pass through zero and are almost linear for small inversed voltages; they approximate a quadratic in the "pass area" (Durchlassbereich). Silicon diodes are now being used increasingly as rectifiers for alternating voltage and as mixer diodes (Mischdioden) for highest frequencies. In addition to numerous applications which they have in special fields, the diodes are particularly useful in ultrashort wave and centimeter work. The fact that the characteristic line (Kennlinie) is not linear makes it possible to use diodes in many special circuits for the purpose of measurement.

2. The following are general indications also contained in the directive on the construction of diodes by the firm:

CLASSIFICATION

STATE	NAVY	NSRB	DISTRIBUTION		OSI EV	X
ARMY	AIR	FBI			ORR EV	X

25X1

"Two metal caps are welded upon a ceramic shell. One cap houses the anti-electrode of the silicon crystal, which consists of an "S"-shaped molybdenum wire of 90-micron diameter. The other cap has a thread which holds the screw electrode upon which the silicon crystal is welded. These diodes, thus, are point-contact diodes causing rectification through the contact between metal point and semi-conductor crystal."

3. The firm puts out two types of diodes called mixer diodes (Mischdioden) and directional diodes (Richtdioden); in abbreviation, MD and RD. Each type is manufactured in four different construction forms. (See Annexes 1 and 2 for drawings of the four types, with dimensions indicated).

4. The following is the German nomenclature for the characteristic data of the diodes as used in the annexed table (Annex 3), which lists the characteristic data of all diodes manufactured by the Dralowid firm. The numbers in brackets appearing in the following sub-paragraphs are keyed to the numbers appearing in the various headings on Annex 3.

a. The direction of the current with low resistance is called Durchlass-richtung. The current is called Durchlasstrom (1).

b. The direction of the current with high resistance is called Sperrrichtung. The current in this case is called Sperrstrom (2).

c. Both Durchlasstrom and Sperrstrom are currents in Durchlassrichtung which flow at a given direct voltage.

d. The Widerstandsverhaeltnis (3) is the ratio between the Sperrwiderstand and the Durchlasswiderstand at the same absolute voltage value.

e. The maximale Impulsbeanspruchung (4) expressed in watts is the average value of the impulse performance during a second.

f. The statische Eigenkapazitaet (5) is mainly composed of the capacity of the cap and the "Kapazitaet gegen Masse".

g. The mechanical Schuettelfestigkeit (6) is expressed in multiples of the gravitation constant "g". The diodes put out by Dralowid withstand shaking with a sinusoidal acceleration of maximum 5g.

h. The Temperaturbereich (7) of the diodes is the temperature range in which a diode can be stored or operated without permanent change of its electric qualities.

i. The Temperaturkoeffizient (8) pertains to the changes of the current at the given voltage and to the linear temperature dependency of Durchlasstrom and Sperrstrom. It is expressed in percent per centigrade.

j. The Nennfrequenz (9) is the maximum value of frequency up to which a decrease of the Richtstrom is unessential.

k. The Mischdaempfung (10) is determined by the relation between the high frequency input and the medium frequency output. It is expressed in decibels (db).

[redacted] 25X1

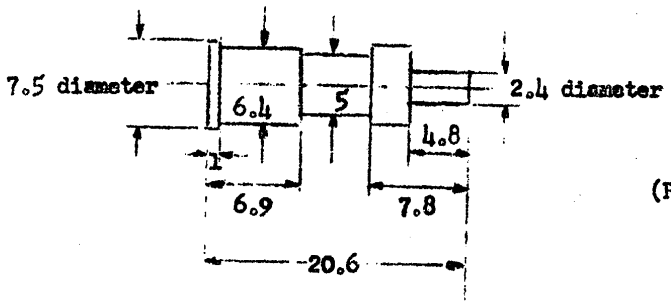
1. [redacted] Comment. The following are English equivalents for the German terms used in paragraph 4: 25X1

Durchlassrichtung - low resistance direction
Durchlasstrom - low resistance current
Sperrichtung - high resistance direction
Sperrstrom - high resistance current
Durchlasswiderstand - low resistance resistor
Sperrwiderstand - high resistance resistor
Widerstandsverhaeltnis - resistance ratio
maximale Impulsbeanspruchung - maximum impulse load
statische Eigenkapazitaet - static self-capacity
Kapazitaet gegen Masse - capacity in relation to the whole
Schuettelfestigkeit - capacity to withstand shaking
Temperaturbereich - temeperature range
Temperaturkoeffizient - temperature coefficient
Nennfrequens - rated frequency
Richtstrom - rectified current
Mischdaempfung - mixed attenuation

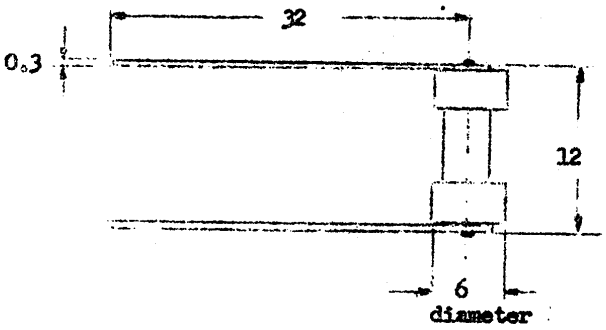
[redacted] 25X1

Annex 1

(All dimensions in millimeters)



Construction type I
(Patronenausfuehrung)

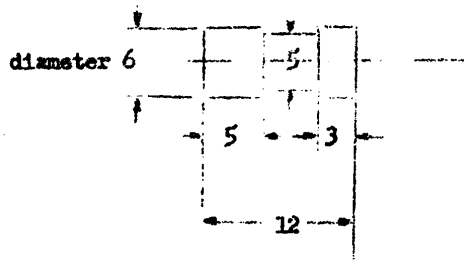


Construction type II
(with Loetfahnen)

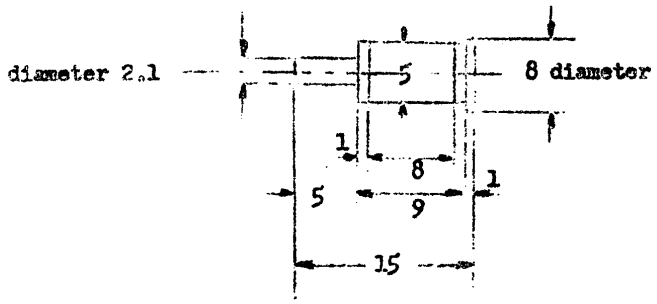
25X1

Annex 2

(All dimensions in millimeters)



Construction type III
(for special purposes)



Construction type IV
(small type)

CHARACTERISTIC DATA OF DRALOWID SILICON DIODES 1/

TYPE	(1) in mA at +0.5V	(2) in micro-A at -0.5V	(3) at ±0.5V	(4) (10-7W)	(5) pF	(6) g	(7) Temperature (C) storage	(7) operation	(8) (+10 to +60 Centigrade %/Temperature at +0.5V	(8) at-0.5V	(9) GHz	(10) db
MD 1	equal or more than 1	equal or less than 200	equal or more than 5	0.3	less than 1	equal or more than 5	-40;+60	-20;+50				
MD 13	equal or more than 2	equal or less than 200	equal or more than 10	0.3	less than 1	equal or more than 5	-40;+60	-20;+50			10	equal or less than 10
MD 2	equal or more than 0.12 at 70mV	equal or less than 60 at -70mV	equal or more than 2 at ±70mV	0.3	less than 1	equal or more than 5	-40;+60	-20;+50				
RD 1	equal or more than 1	equal or less than 100	equal or more than 10	1	less than 1	equal or more than 5	-40;+60	-20;+60	equal or less than 1	equal or less than 5		
RD 2	equal or more than 0.50	equal or less than 20	equal or more than 25	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		
RD 3	equal or more than 0.50	equal or less than 7	equal or more than 35	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		
RD 4	equal or more than 0.10	equal or less than 2	equal or more than 50	1	less than 1	equal or more than 5	-40;+60	-20;+50	equal or less than 1	equal or less than 5		

25X1

25X1

1/ [redacted] Comment: All diodes listed above are fabricated in four types of construction as shown in annexes 1 and 2.

SECRET